ABSTRACT OF THE INVENTION

[0049] A structure is provided which includes first and second layers. The first and second layers are attached to each other by embedding or otherwise attaching at least one mechanically locking z pin to the first layer and then subsequently joining the protruding portion of the z pin to the second layer prior to the second layer being processed to a fully cured state. Alternatively, the z pin material is injected into a cavity formed in the first and second layer and then brought to a fully cured state. The z pin may have physical characteristics such as orientation, melting point and hardness as a function of the physical characteristics of the first and second layer and the forces subjected upon the first and second layers. For example, the z pin may define a longitudinal axis and be embedded within the first and second layers in alignment with an applied force subjected on the first and second layers. This ensures that the z-pin is subjected primarily to tensile forces which allows designs to better control the failure mode of the attached first and second layers.